DOCUMENT RESUME

ED 103 478 TM 004 324

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TITLE Effects of Instructions on False Recognition.
PUB DATE [May 74]
NOTE 26p.; Paper presented at the Annual Convention of the Midwestern Psychological Association (Chicago, Illinois, May 2, 1974)

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS *Association (Psychological); Associative Learning; Cognitive Processes; Memory; *Response Style (Tests); Stimuli; *Testing; Verbal Stimuli

ABSTRACT

Four experiments were conducted to examine the effects of various processing instructions on the rate of false recognition. The continuous single-item procedure was used, and false recognitions of four types were examined: synonyms, antonyms, nonsemantic associates, and homonyms. The instructions encouraged subjects to think of associates, usages (features), images, or rhymes. The only differences between the experiments were presentation rate and specific instructions included. Only the fourth experiment produced a statistically signficant instructions effect, with features, images, and rhymes instructions reducing false recognitions, of all types, and associates producing slightly more. The inconsistency of the effects over the four studies, however, suggests that a cautious interpretation is warranted. (Author)

ED103478

Paper read at the annual meetings of the Midwestern Psychological Association, Chicago, May 2, 1974.

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EFFECTS OF INSTRUCTIONS ON FALSE RECOGNITION[1]

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Abstract

Four experiments were conducted to examine the effects of various processing instructions on the rate of false recognition. The continuous single-item procedure was used, and false recognitions of four types were examined: synonyms, antonyms, nonsematic associates, and homonyms. The instructions encouraged Ss to think of associates, usages (features), images, or rhymes. The only differences between the experiments were presentation rate and specific instructions included. Only the fourth experiment produced a statistically significant instructions effect, with features, images, and rhymes instructions reducing false recognitions, of all types, and associates producing slightly more. The inconsistency of the effects over the four studies, however, suggests that a cautious interpretation is warranted.

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The present research involves the recognition procedure where Ss must identify each word in a test list as "new" or "old" in terms of whether it was presented in a prior phase or earlier in the current list. False recognitions are said to have occurred when S incorrectly identifies a new word as previously presented (Underwood, 1965). When the word falsely recognized is related in some way to a word actually shown before, e.g., JUMP--LEAP, this is generally taken as evidence that S initially encoded the overlapping attributes. A question of theoretical interest is whether all such false recognitions are due to associative networks or to feature-tagging instead (e.g., Grossman & Eagle, 1970).

One approach to manipulating Ss' likelihood of processing particular features involves instructing Ss to utilize certain encoding strategies. For example, Hall (1969) observed that instructions to think of word associates increased the rate of false recognitions for word associates. However, Hall and Pierce (1972) found that such instructions reduced false recognitions, for both word associates and rhymes. Cramer (1972) observed that "age-appropriate" instructions reduced phonemic and semantic false recognitions for first and fifth graders. Relative to their learning (control) group, Elias and Perfetti (1973) observed that instructions to think of synonyms or associates generally reduced false recognitions, while thinking of rhymes increased most false recognitions. While these experiments involved separate study and test phases with single-item presentation in both phases, such strategies have been found to improve recognition performance when the test phase involves

multiple-item presentation (e.g., Cermak, Schnorr, Buschke, & Atkinson, 1970; Light & Selhorst, 1971).

However, no studies seem to have varied instructions in the original continuous single-item paradigm. It appeared initially that the extension would be straight-forward, over a year ago when we began this series of experiments, and in the interim some of the studies cited above appeared to keep this hope alive. However, our success has been limited, and our colleagues have now suggested we stop depleting the subject pool!

Experiment I

The first experiment was conducted as a test of processing strategies in continuous single-item recognition memory. The theoretical alternatives of implicit-associative-responses versus feature-tagging indicated that strategies emphasizing these activities should be studied first. Furthermore, since these strategies might be expected to be differentially effective for specific intralist relationships, the type of possible false recognition was also varied.

Materials

The list contained 6 cases of synonymity, 6 cases of antonymity, and 6 cases of associations without obvious semantic connection; these three types were equated in terms of average associative strength. The range of associative strength was from a probability of 0.20 to 0.82, and certain analyses involved pooling 2 items from each semantic type into high, medium, and low associative strength groupings. In addition, 6 cases of homonymity were included; while associative relationships could

not be checked in the norms for these, there appeared to be minimal connections.

Each critical stimulus was repeated once, at a lag of approximately 12 items. The experimental (E) words followed the repetition of the critical stimulus at a lag of about 25 items. The control (C) words immediately preceded the E words half of the time, and followed them half of the time. The C words were chosen so as to approximately match the E word in terms of such attributes as frequency, number of syllables, judged concreteness, etc. Filler items were added to the list for a total of 160 items. The first four items were fillers, and one-third of the fillers were repeated once, and another third were repeated twice.

Procedure

The list was presented visually at a 5-second rate to a large group. This rate seemed about as fast as Ss could look up and down to mark their answer sheets. The special instructions were implemented via cover sheets, and an example was given in each case. One-third of the 60 Ss were instructed to think of associates to each item, and one-third were told to think of brief definitions for different usages (dictionary meanings) of each word. In the latter case, the word "features" was not explicitly used. The remaining Ss received no special instructions.[2]

Results

The results were analyzed in an Instructions (none, associates, features) X Type (synonym, antonym, homonym, associate) X Word (E, C) analysis of variance. Figure 1 presents

the average number of false recognitions by instructions (maximum = 24). There was a marginally significant effect due to strategies, as thinking of associates reduced the false recognition rate [F (2,57) = 2.45, $p < .10$], but there was no Instructions X Word interaction [$F < 1$], nor any other interactions involving instructions [$Fs < 1$]. Of course, the overall E/C word difference was quite significant [F (1,57) = 26.81, $p < .001$.]

Figure 2 shows the average false recognitions by type of relationship (maximum = 6). There was a significant types main effect [F (3,171) = 2.80, $p < .05$], which seemed to reflect the slightly higher rate with nonsematic associates. However, the Type X Word (E/C) interaction was not significant [$F < 1$].

Figure 2 also presents the average number of false recognitions by associative strength, excluding homonyms. Substituting Strength as a factor in place of Type in the analysis revealed a significant strength main effect [F (2,114) = 3.05, $p < .05$], as there were more false recognitions for the strong associates compared to the weak and intermediate ones. However, there was no interaction with either instructions [F (2,57) = 1.43] or E/C word [$F < 1$].

Insert Figures 1 & 2 about here

Discussion

The results of this first experiment "were encouraging". While the instructions effect was only marginally significant, it did appear that the associates strategy might reduce false

recognitions. It occurred to us that the introduction of instructions via the cover sheet technique might have left some subjects without complete understanding of the strategy. The instructions and examples seemed quite clear, but we decided to replicate the experiment running Ss individually.

Experiment II

The second experiment was a replication of the first, using the same list, with the following procedural changes. The 60 Ss were run individually, using the same instructions and examples as before. In this case, the Ss responded by pressing either the left or right side of the split-screen module of a Lehigh Valley Human Test System.[3] Since this mode of responding did not involve looking up and down to mark answer sheets, we reduced the presentation rate to 3 sec. per item.

Results

The Instructions X Semantic Type X Word (E/C) analysis again revealed a marginally significant instructions main effect [F (2,57) = 2.81, $p < .10$]. As Figure 3 shows, however, the associates strategy now produced more rather than fewer false recognitions! As before, there were no interactions with instructions [Fs < 1.59].

Figure 4 presents the false recognitions by semantic type and associative strength. There was no main effect for semantic types [F (3,171) = 1.85], but the Types X Word (E/C) interaction was significant [F (3,171) = 3.82, $p < .025$]. This interaction seemed to reflect the smaller difference between E and C words for antonyms.

The analysis by associative strength revealed a significant strength main effect as before [F (2,114) = 3.94, p < .05], but no interactions with associative strength.

Insert Figures 3 & 4 about here

Discussion

The results of the second experiment "were puzzling". Whereas there had been a tendency in Experiment I for the associates strategy to reduce false recognitions, in Experiment II the opposite was true. Both results were present only at marginal levels of significance, and thus the "discrepancy" may signify nothing.

Experiment III

Although the change in presentation rate was incidental, in view of the change in the results, we decided to examine this factor further. Subjects might certainly be less able to utilize their strategies at more rapid rates. The third experiment added a more specific strategy, a group told to think of images for the words, but otherwise simply replicated the first two experiments at two different presentation rates. Sixty-eight Ss were run at a 3-sec. rate of presentation, and 68 at a 6-sec. rate. Other procedures were comparable to the previous studies, with the Ss run in large groups.

Results

The analysis of false positive responses by semantic types revealed no main effect of instructions nor any interactions with instructions [Fs < 1]. As Figure 5 shows, there was a main

effect due to rate [F (1,128) = 3.06, $p < .10$], but rate did not interact with instructions [$F < 1$].

Figure 6 shows the false positives by semantic type. The word (E/C) main effect was significant as before [F (1,128) = 87.23, $p < .001$], and this factor interacted with both rate [F (1,128) = 3.13, $p < .10$] and semantic type [F(3,384) = 5.44, $p < .001$]. The interaction with rate reflects improvement at the slower rate primarily on the E words, rather than the C words. The interaction with type again seemed to indicate the smaller difference between E and C words for antonyms.

Figure 7 presents the analysis by associative strength. The main effect of associative strength was significant [F(2,256) = 10.03, $p < .001$], as both the strongest and weakest associates produced somewhat more false positives. However, the Strength X Word (E/C) interaction was not significant [$F < 1$], nor were the Strength X Rate or Strength X Rate X Word interactions [Fs < 1.49].

Insert Figures 5, 6, 7 about here

Discussion

The third experiment did not indicate a simple resolution in terms of rate of presentation. The strategy effects were quite small, even at the slower rate. The added group, images, was not notably different from the others. Several possible interpretations seemed feasible at this point, but we decided to try one more experiment.

Experiment IV

The previous studies had all used encoding strategies which basically emphasized semantic content (except for perhaps the images strategy). It seemed possible that the absence of effects might be due to the underlying homogeneity of the strategies, coupled with the fact that Ss in the control group probably were emphasizing meaning as well. Thus we conducted the same basic experiment at a 6-sec. rate of presentation, with an additional group which was told to think of similar sounding words or rhymes. It seemed that this might correspond to a "shallower" encoding (Craik & Lockhart, 1972), and that this group might show generally fewer semantic false recognitions, with especially high homonym false recognitions. Except for the addition of this group, Experiment IV essentially replicated the 6-sec. part of Experiment III with 100 new subjects.

Results

The Instructions X Type X Word (E/C) analysis of false positives revealed a significant main effect due to instructions [F (4,95) = 4.07, $p < .005$]. Figure 8 shows that the associates group was a little worse than the control, while all other instructions were better than the control group. However, there were no interactions with instructions [Fs < 1.10], including no evidence that the rhymes group made more false positives on the homonyms.

The false positives by semantic type are shown in Figure 9. Although synonyms appeared to produce a few more false positives, the main effect of semantic type was not significant [F (3,285) =

1.37], nor was the Type X Word (E/C) interaction [F (3,285) = 2.03].

Figure 10 shows the number of false positives by associative strength. The strength main effect was significant [F (2,190) = 5.38, $p < .025$], as the high probability associates produced more false positives than the moderate and low probability associates. There were no interactions involving associative strength, however, including the Strength X Word (E/C) interaction [F (2,190) = 1.88].

Insert Figures 8, 9, 10 about here

Discussion

Experiment IV provided no real resolution of the problem. Though the strategies main effect did reach significance in this study, the pattern of results was not consistent with the earlier studies. For example, the associates groups in Experiments III and IV show both facilitation (Figure 5) and interference (Figure 8) at the same rate of presentation. The rhymes group did not add anything new to the overall picture. Actually, closer inspection of the results of Experiments I-III also reveals that the application of a "depth of encoding" analysis might be unproductive; e.g., the absence of a difference between homonyms and the other types with semantic strategies.

GENERAL DISCUSSION

Summarizing the present empirical results is not easy. The effect of instructions on false recognitions in continuous single-item recognition is hardly clarified by this series of

studies. It may well be that the phenomenon in question occurred at such a low rate (never greater than 25%, usually around 15%) that instructions effects were bound to be limited (a "floor" effect).[5] Yet the critical problem here seems not the level of significance, but the absence of a consistent pattern over all four experiments in terms of the directions of the effects. However, there are two differences between the present procedures and the separate study-test phase methodology on the one hand and the multiple-item presentation procedure on the other hand which may be important also.

First, the lag between critical stimuli and the E words is generally much longer in the two-phase studies than it was here. Perhaps temporal lag has an important effect here, with confusions and thus the effect of strategies increasing with lag. That may be the reason that the strategies began to show facilitation at the slow rate in Experiment III, but note that the 6-sec. conditions in Experiment III produced different effects in Experiment IV.

Secondly, the multiple-item procedure forces S to attend to distinguishing features of each grouping (e.g., Buschke & Lenon, 1969, but see Bruder & Silverman, 1972), whereas that is not required with the single-item procedure. It has been argued that this is the critical factor in multiple-item recognition (e.g., Kausler, 1974), and it would seem less involved in single-item recognition procedures. That is, S is not normally induced to attend to specific features in the single-item procedure, and apparently instructions simply will not substitute as effectively as the presence of a comparison item.

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FOOTNOTES

1. The authors would like to acknowledge the encouragement of Donald Kausler, which kept this series of experiments going after Experiment II, and even after Experiment III; however, nothing seems sufficient to warrant Experiment V!

2. This neutral baseline seems advisable, though several studies have assumed that instructions to "just repeat" the word will suffice. It seems possible that the instructions to just repeat might actually interfere, producing an artificially low baseline group.

3. In addition, S stated a number from 1 to 5 to indicate his degree of confidence. These data, and response latencies, were analyzed also, and revealed little not apparent in the yes/no data. Thus they will not be reported here.

4. As it turned out, running the Ss individually simply resulted in larger error variance, and not a more significant instructions effect. In both experiments the Ss were asked to rate the effectiveness of the strategies after the last item, on a scale from 1 to 7, and there were no apparent differences between the two studies on this point. Thus the group procedure was used in the remaining experiments for efficiency.

Footnotes, continued

5. The weak effect of instructions on false recognitions was also mirrored in the hit-rate data. For the items actually repeated in the test list, the main effects of instructions never exceeded the $p < .10$ level, although the instructions usually improved hit rate slightly. In this case, since the hit rates were so high, i.e., 92-97% across conditions in the various studies, perhaps a "ceiling effect" is present.

FIGURE CAPTIONS

Figure 1. Average number of false positives for experimental and control words by instruction condition in Experiment I.

Figure 2. Average number of false positives for experimental and control words by semantic type (top) and associative strength (bottom) in Experiment I.

Figure 3. Average number of false positives for experimental and control words by instruction condition in Experiment II.

Figure 4. Average number of false positives for experimental and control words by semantic type (top) and associative strength (bottom) in Experiment II.

Figure 5. Average number of false positives for experimental and control words by instruction condition at each presentation rate in Experiment III.

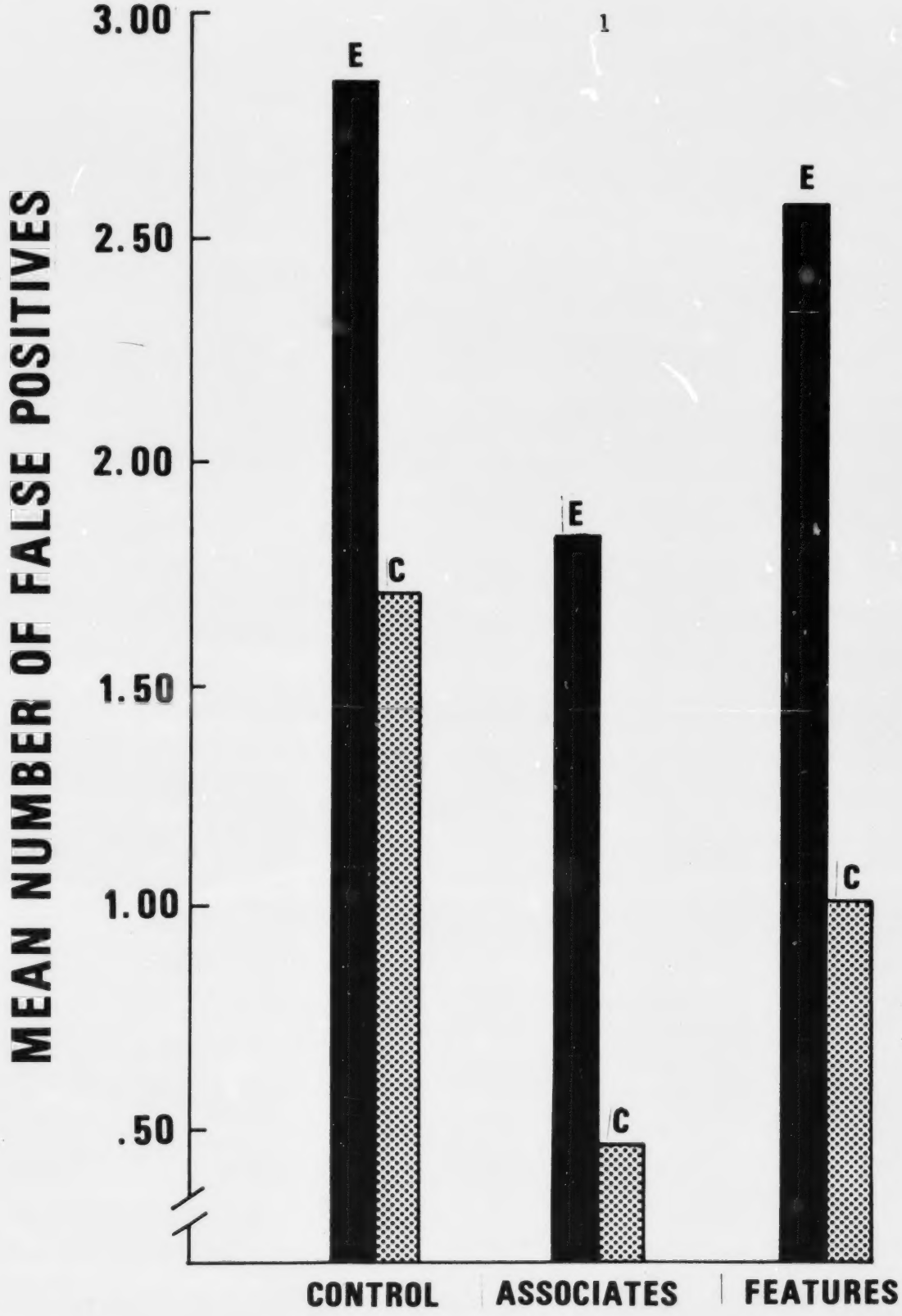
Figure 6. Average number of false positives for experimental and control words by semantic type at each presentation rate in Experiment III.

Figure 7. Average number of false positives for experimental and control words by associative strength at each presentation rate in Experiment III.

Figure 8. Average number of false positives for experimental and control words by instruction condition in Experiment IV.

Figure 9. Average number of false positives for experimental and control words by semantic type in Experiment IV.

Figure 10. Average number of false positives for experimental and control words by associative strength in Experiment IV.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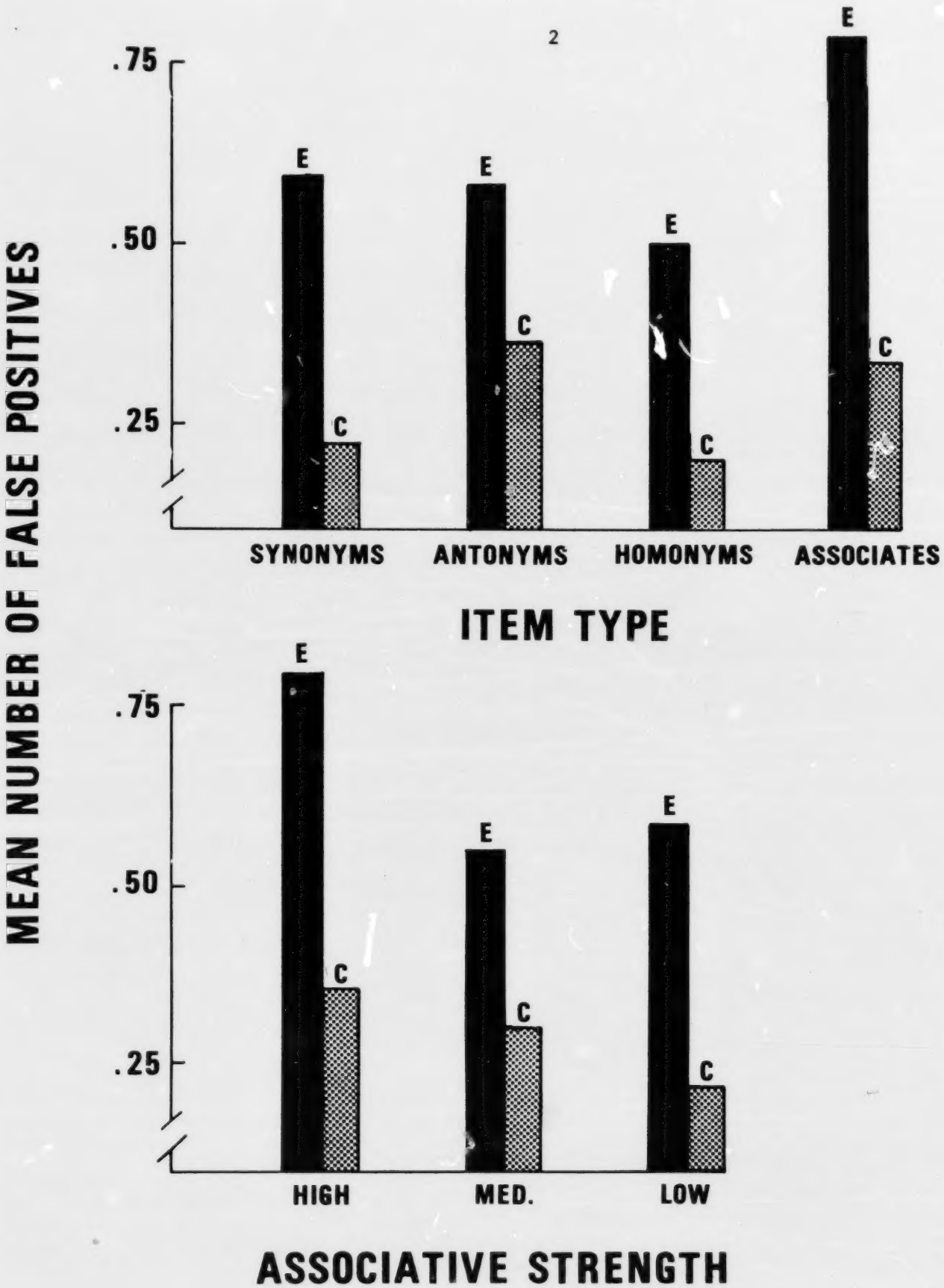
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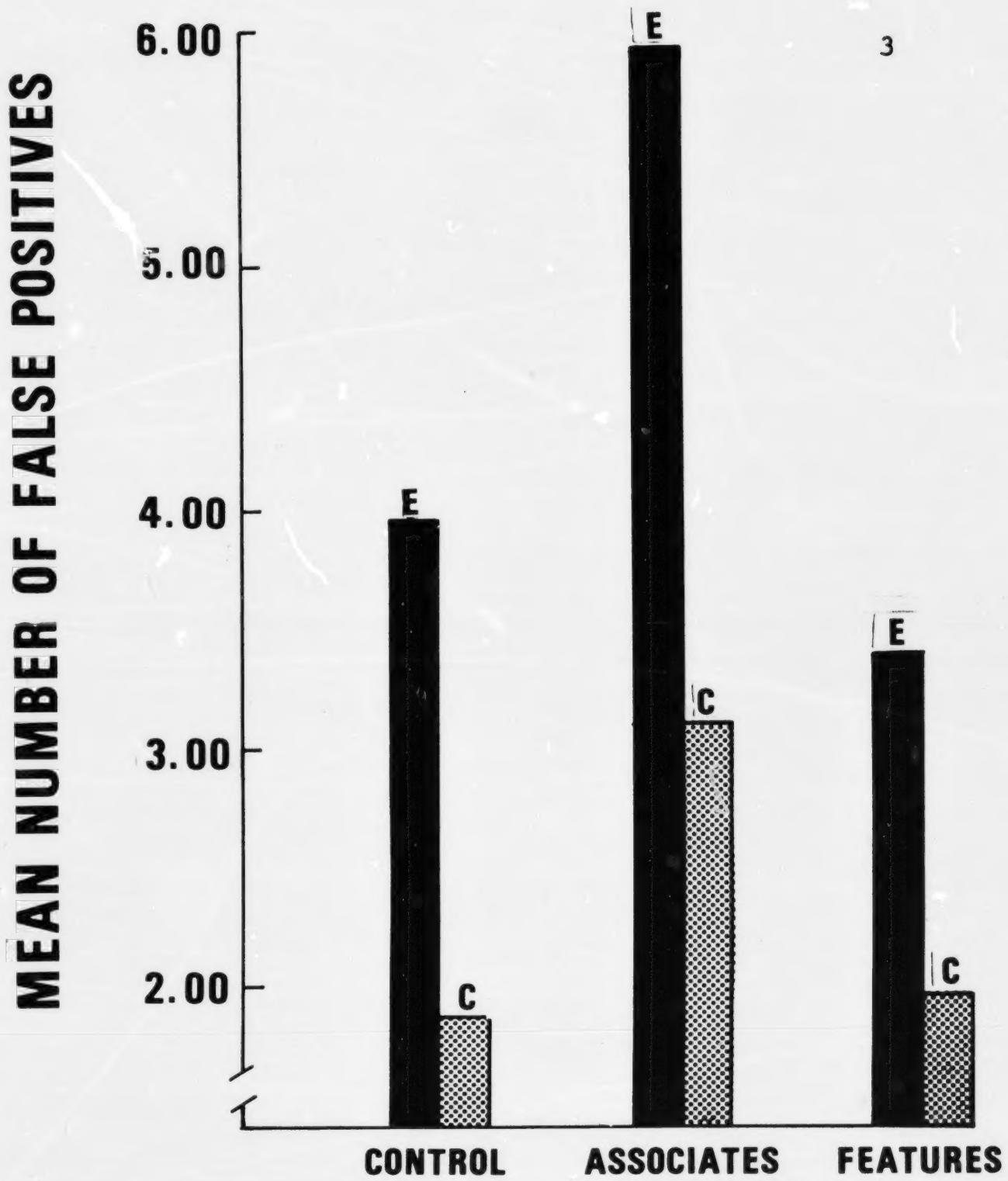
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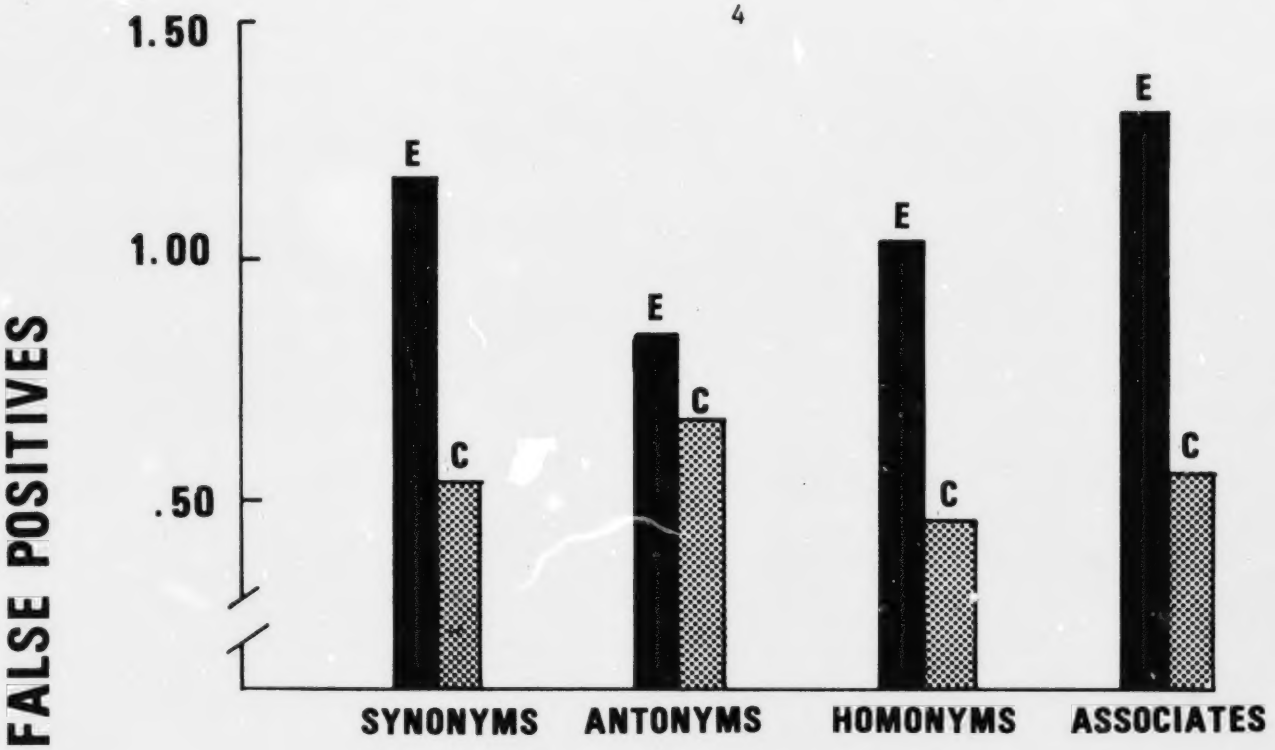
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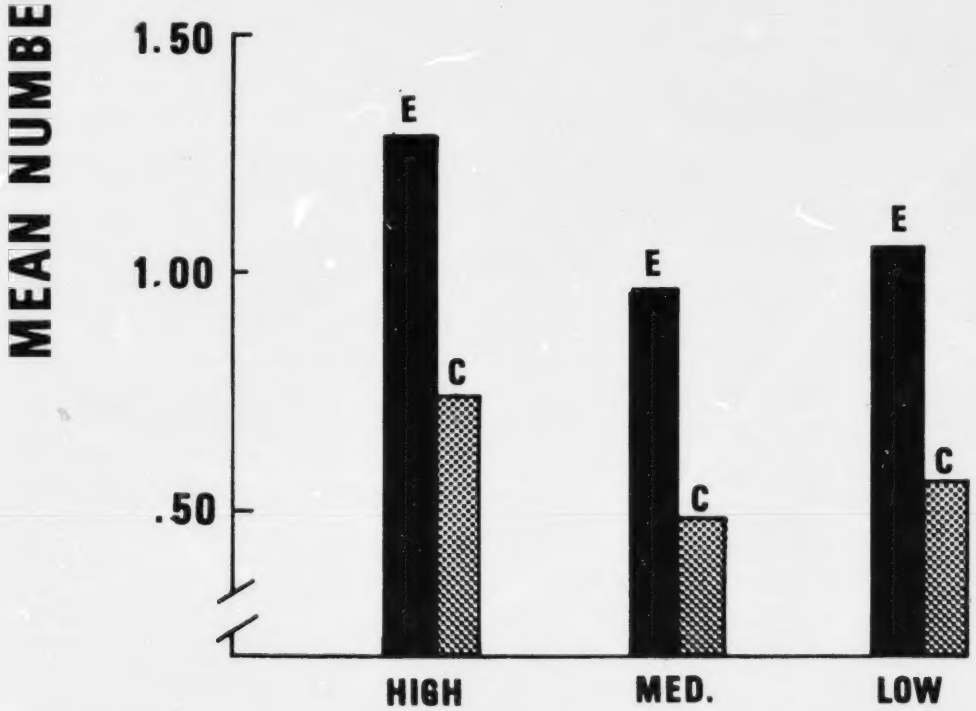
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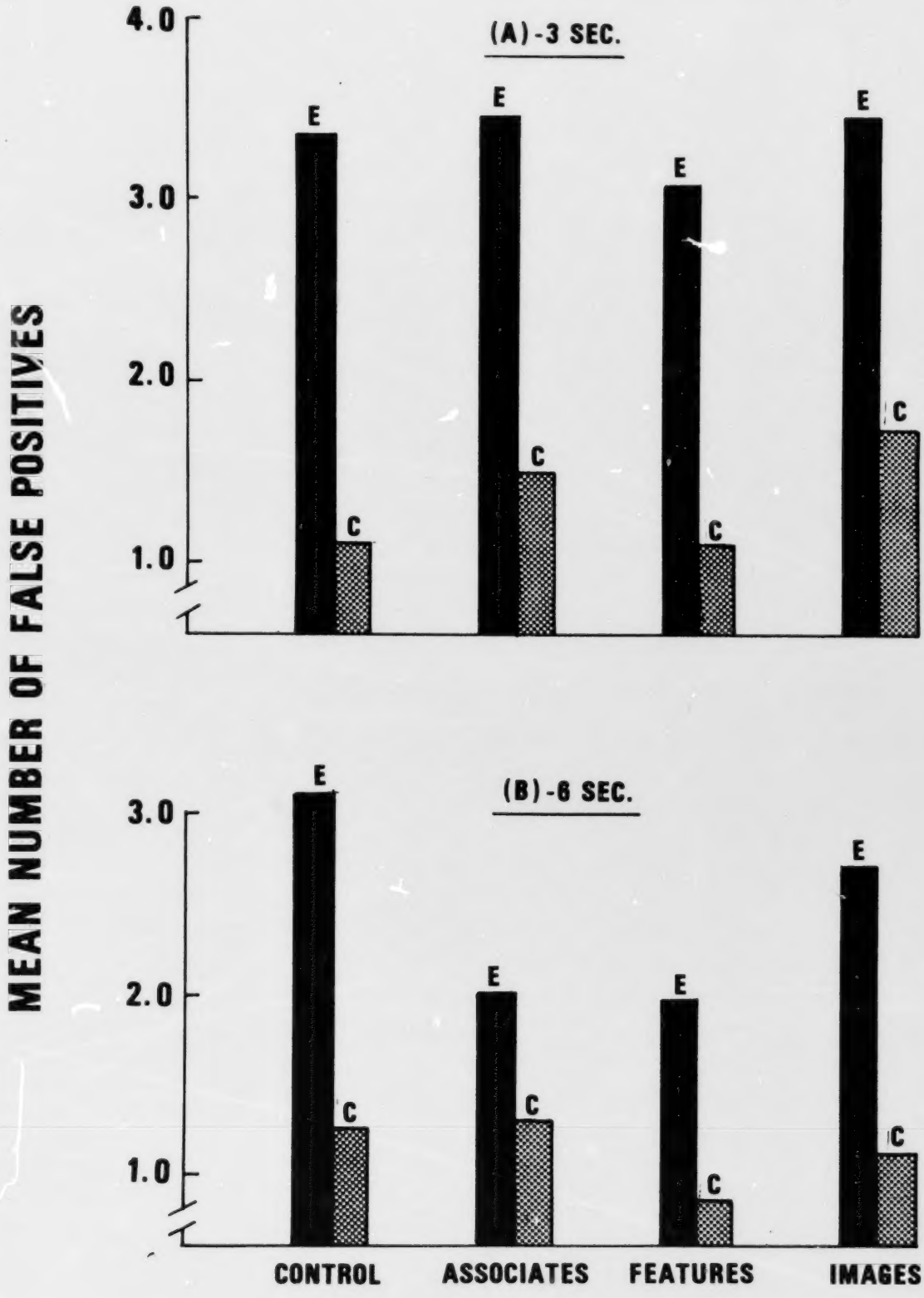

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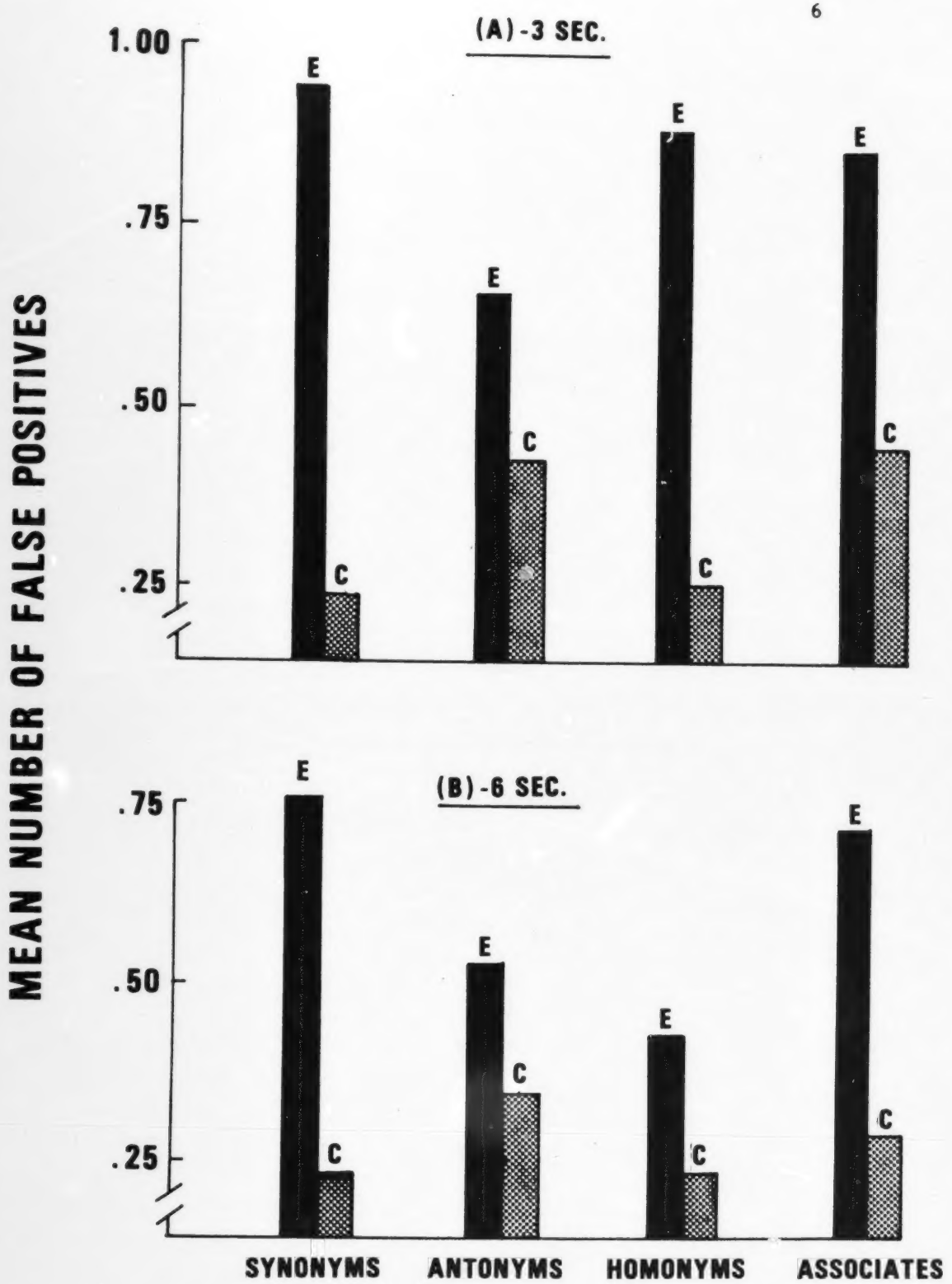
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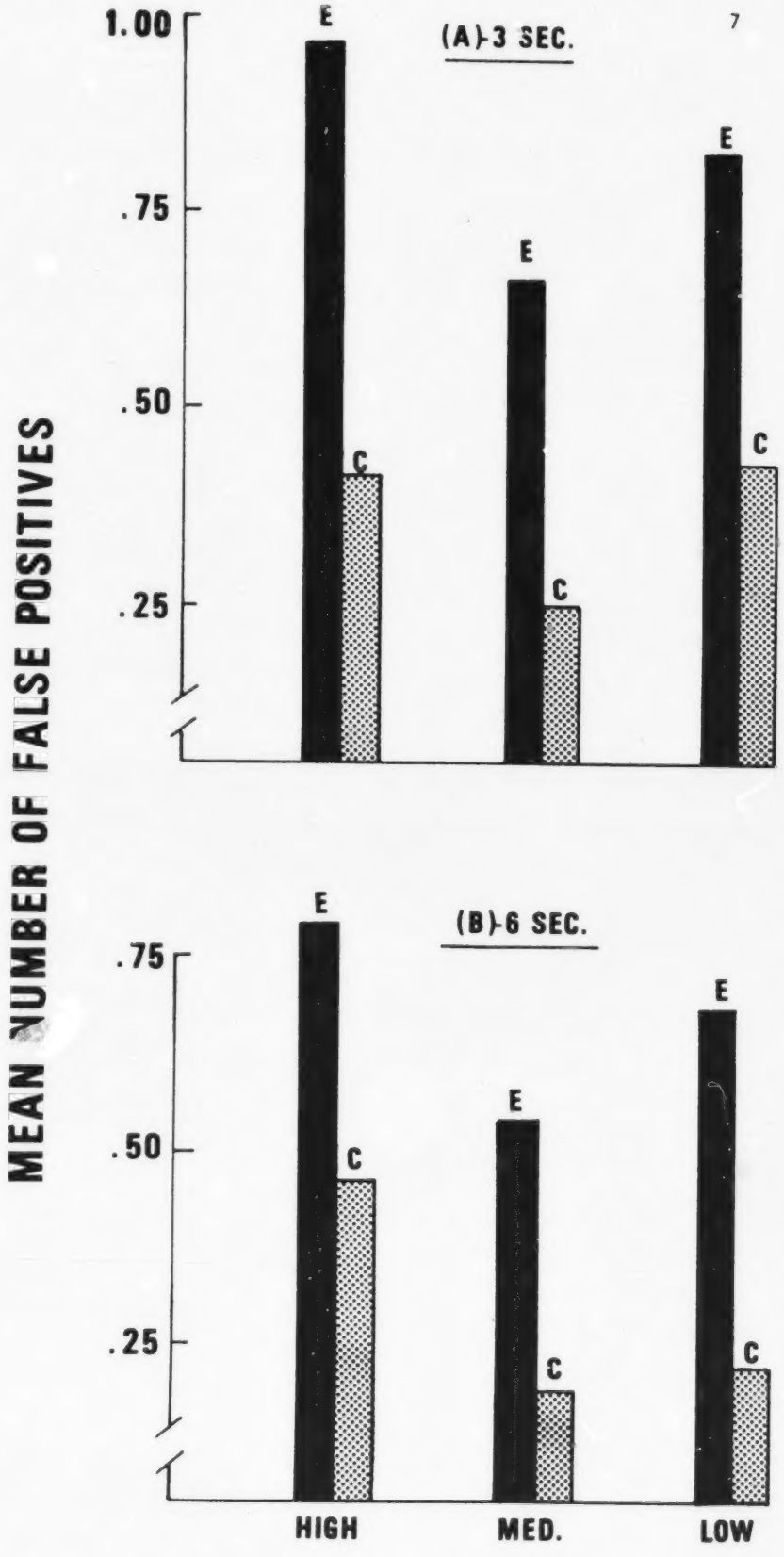
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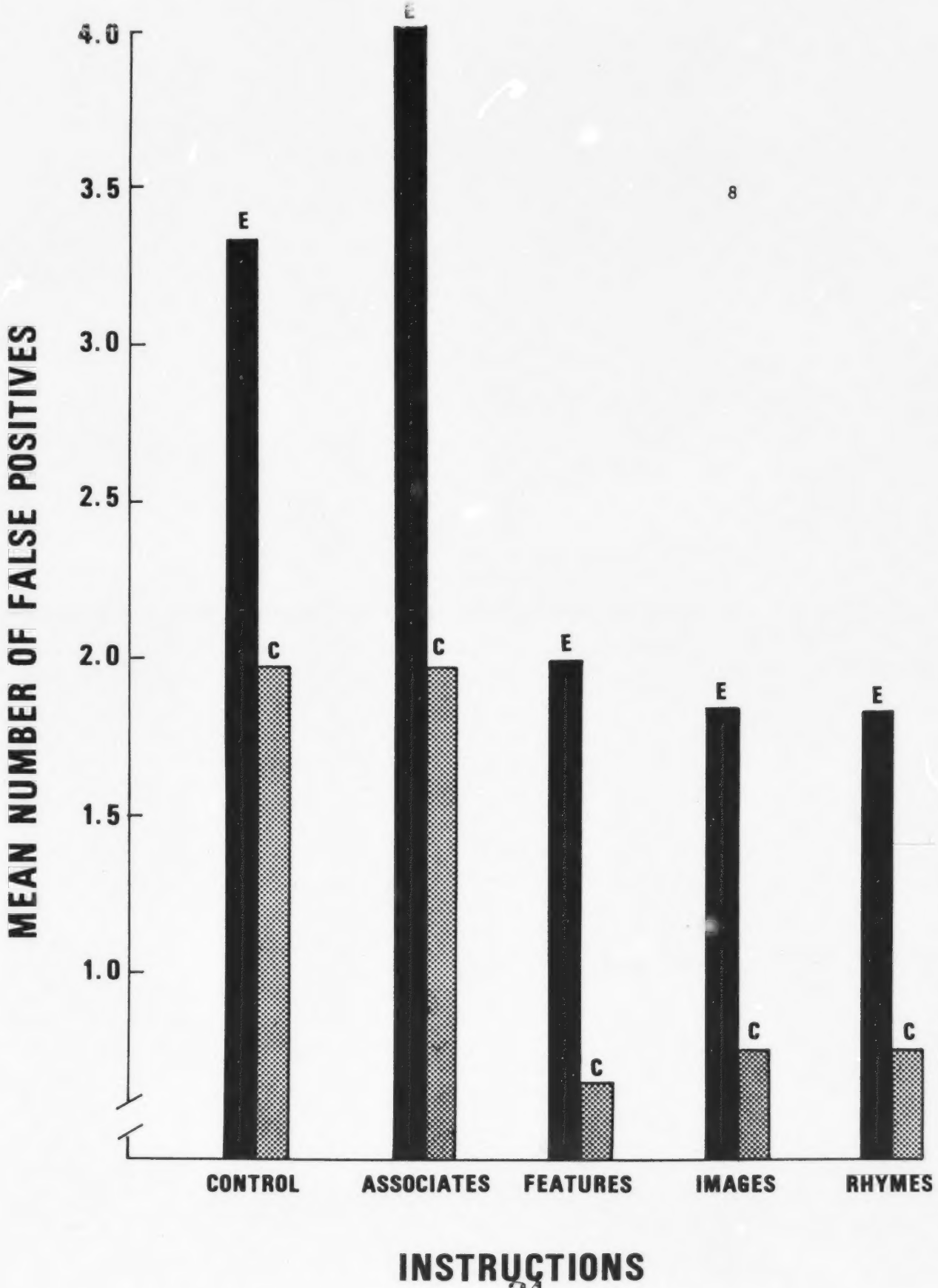
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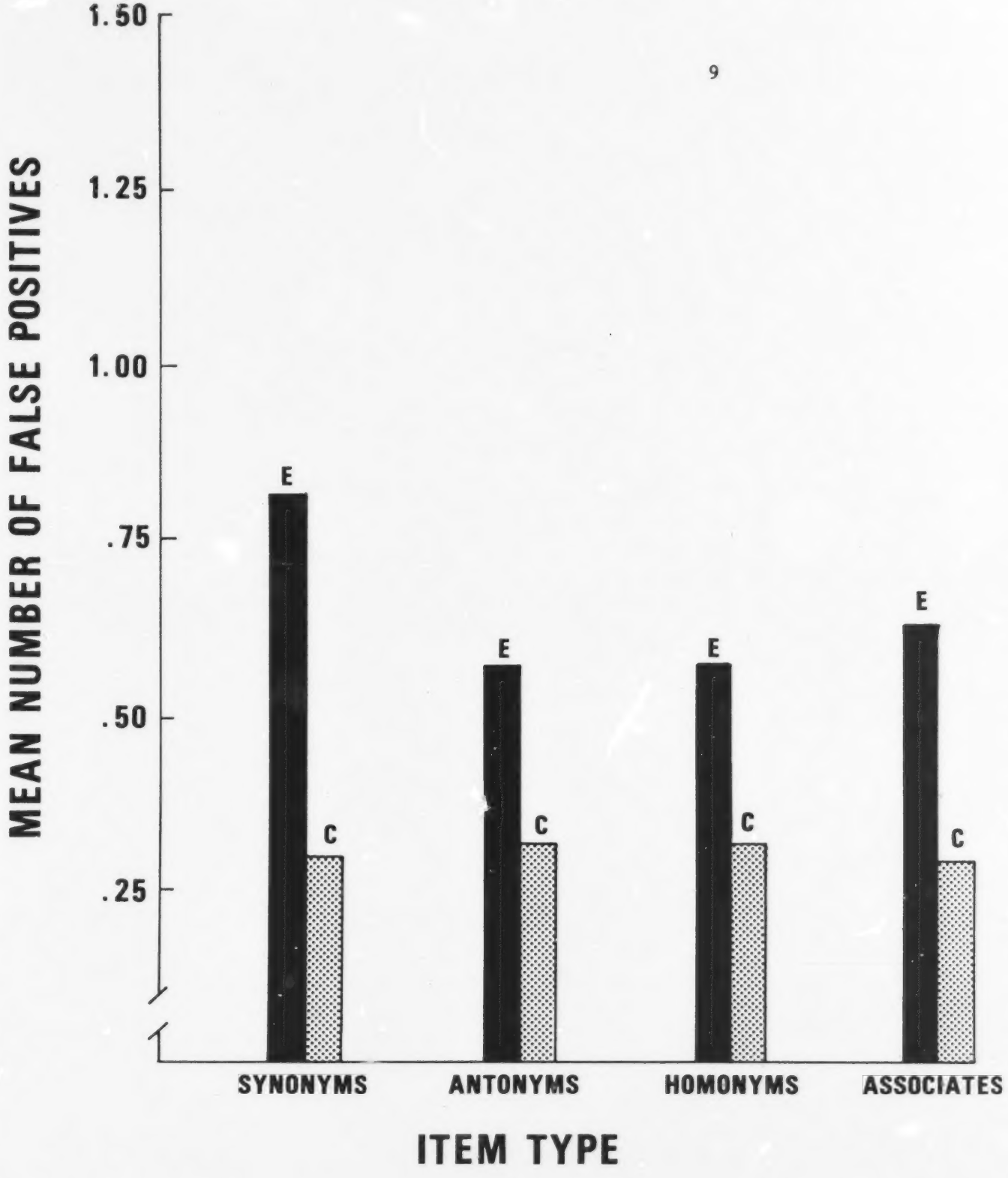
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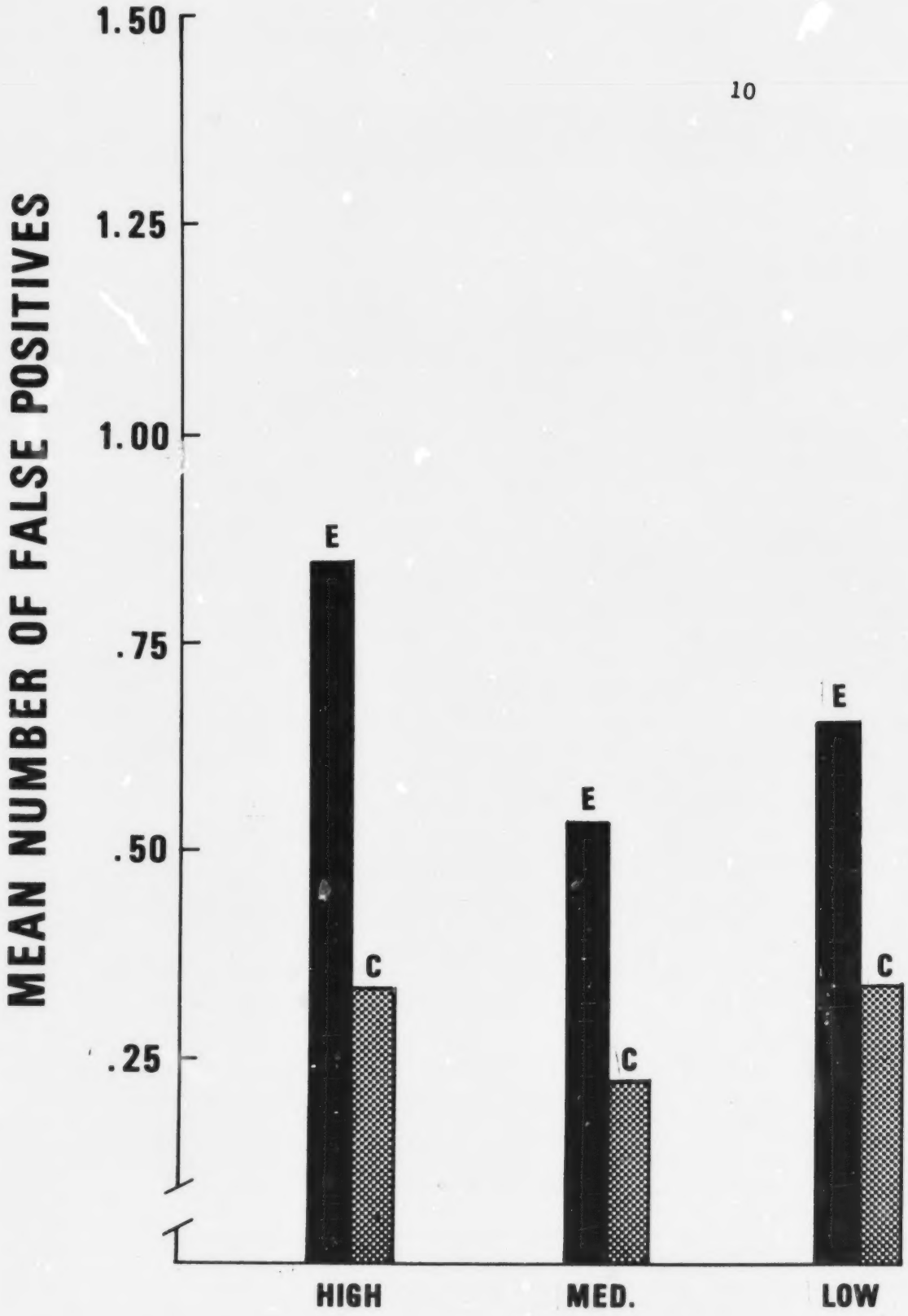
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